

A

VIEW OF THE  
METAPHYSICAL AND PHYSIOLOGICAL  
ARGUMENTS  
IN FAVOUR OF  
MATERIALISM.

BY A PHYSICIAN.

Ποιησον δ' αιθρην; δος δ' αφθαλμοισιν ιδεσθαι  
Εγ δη φασ και ολεσσον.

Grant us day light and fair play.

HOMER.

PHILADELPHIA.

1824.

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E MOST COMPETENT JUDGES OF THE ARGU-  
MENTS CONTAINED IN THEM.



## ON THE SOUL.

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MAN consists of a body, which, when living, exhibits a peculiar organization, and certain phenomena connected with it, termed intellectual; such as perception, memory, thinking or reasoning, and willing or determining. When the body ceases to live, it becomes decomposed into carbon, azote, hydrogen, oxygen, phosphorus, and lime; and perhaps another substance or two: all of them similar to what we find in the inanimate material bodies around us. We differ from them so far as we can judge by our senses, in no way, but in possessing a peculiar organization which those bodies have not. But as no configuration or disposition of the particles of which our bodies are composed, can amount to any thing more than varieties of position—varieties of matter and motion, we have no reason to ascribe perception, memory, thought, or will, to any form of matter and motion, however varied. From matter and motion, nothing but matter and motion can result. The phenomena of intellect are too dissimilar to allow us to consider them as the result of, or as varieties of matter and motion. We must therefore recur to some other principle as the source of intellect: and that cannot be the body. It must be something different from mere matter and motion, something immaterial, something that has no relation to matter: that some-

thing, be it a separate being, or a separate principle, is the Soul. Will any arrangement of carbon, azote, hydrogen and oxygen, produce a syllogism? Having no relation to matter, being essentially immaterial, this source of intellect is not, like matter, liable to decomposition and decay: it is therefore immortal: it dies not when the body dies. It puts a future state, therefore, out of doubt, for it lives when the body is no more.

Such are the views generally taken of this question by those who believe in the separate existence of an immaterial *Soul* as the cause and origin of all the phenomena termed mental or intellectual. With them, it is absurd to ascribe the sublime fictions of poetry, or the sublimer disquisitions of Newton and La Place, to a mere arrangement of assimilated particles of the grossest kind; possessing, before their entrance into the body, and when thrown by the exhalant vessels out of it, nothing approaching the nature of intellect under any of its denominations.

In the present view of the subject, all arguments of a theological nature are excluded. They can be considered apart: and they are to the full as difficult of solution, as the arguments deduced from natural phenomena; and are productive of as much practical discrepancy.

The Immaterialists of modern days are led on still further. They say that the tendency to organization itself, and all the results of that tendency, must have been originally imparted and communicated to inert matter, which could not have assumed this tendency by any effort of its own. That organization, life, and the properties connected with life, as feeding, digestion, assimilation, excretion, &c. as well as the phenomena termed intellectual, cannot arise from any known property of matter as such; and therefore must have been originally impressed by that Be-

ing to whom all creation is to be ascribed. That the phenomena termed intellectual are clearly distinguishable from the other phenomena of living organized matter,—they are peculiar to the human species—not to be accounted for from the common properties of organization or life, and are therefore owing to a separate and distinct communication from the author of our common existence. That not being ascribable to any form of organization, or to be regarded as the result of it, they must of necessity be ascribed to some separate being of a different and superior nature from matter; destined during the present life to act by means of the bodily organs. This separate being is the *Soul*. It is granted that we are not to argue from the possibility of any thing, to its actual existence, (*a posse ad esse non valet consequentia*) but when the phenomena cannot be explained by any known properties of organized or unorganized matter, we are of necessity driven to something else than—something beside matter—something which is not matter, to explain appearances that are not material.

I do not know how to state better, more fairly, or more forcibly, the views taken of this question by the writers who contend for the separate existence of the Soul, as a being perfectly immaterial, and by consequence incorruptible and immortal.

On the other hand, the *Materialists*, who ascribe all the phenomena termed intellectual, to the body; and consider them as the properties of organized matter, the result of that organization, —reason as follows:

Their arguments may be considered, as 1. *Metaphysical*, and 2. *Physiological*.

To begin with the FIRST class.

1. The only reason we have for asserting in any case that one thing is the property of another, is the certainty or universality with which

we always find them accompanying each other. Thus, we say gold is ductile, because we have always found gold, when pure, to be so. We assert that manure will nourish a plant, that muscular fibres are irritable, that the nerves are the instruments of sensation, &c. for the same reason. Let the reader sit down, and describe a mineral by its characters; and he will have no doubt of the truth of this assertion.

Moreover, finding by experience that every thing we see has some *cause* of its existence, we are induced to ascribe the constant concomitance of a substance, and any of its properties to some necessary connexion between them. Hence therefore, *certainty and universality of concomitance is the sole ground for asserting or supposing a necessary connexion between two phenomena.* And we cannot help believing that like consequences will invariably follow like antecedents under like circumstances.

There is a necessary connexion between such a structure as the nervous system in animals, and the property of sensation, or as it is often called, perception—the property of feeling, of being conscious of impressions made upon our senses. For there is precisely the same reason for making this assertion, as there can be for any other the most incontestable; namely, the certainty and universality wherewith (in a healthy state of the system) we observe perception and the nervous system accompany each other. The seat of perception, so far as we know from the facts of anatomy and physiology, is situated at the internal sentient extremity of the nerve impressed. But be it there or elsewhere, as it manifestly belongs to the nervous system, that is sufficient for the purpose. It must be somewhere. Let the reader, according to his best judgment from known facts, place it where he thinks fit, and it will equally serve the purposes of my ar-

gument. Perception, sensation, feeling, consciousness of impressions (for all these terms have been used synonymously; I prefer the first) is a property of the nervous apparatus belonging to animal bodies in health and life. When the sentient extremities of a nerve are excited or impressed, perception is the certain instantaneous result, as surely as the peculiar weight, colour, ductility, and affinities of gold are the result of gold, when obtained pure. These properties are inseparable. You must define gold by them: in like manner, you must define the properties of the nervous system by perception—sensation.

I consider this argument as conclusive; unless it can be shewn *how* perception results necessarily from something distinct from, and independent of the nervous system, or that, whether this can be shewn or not, the assertion that perception does so result, implies a contradiction, and therefore is at all events inadmissible.

That certainty and universality of concomitance is the sole ground for asserting a necessary connexion between two phenomena, or that the one is the result of the other, is so true that if this be false, no argument from induction can possibly be true: for all proofs from induction imply the truth of this. And as no direct contradiction has ever been attempted to be shewn in the assertion that perception is the result of organization—as the matter of fact, so far as our senses can judge, is plainly so,—and as no Immaterialist has ever yet pretended to account *how* perception results from an immaterial rather than a material substance, there is nothing more requisite to prove that perception is really and truly the result of our organization. The argument then stands thus: Certainty and universality of concomitance between two or more phenomena, are the only direct reasons we have, for asserting or supposing a necessary connexion be-

tween them. The property of perception and a sound state of the nervous system under excitation, are certainly and universally concomitant. Therefore this concomitance furnishes the only direct reason we have for asserting a necessary connexion between perception and the nervous system. But this reason is the same that we have for asserting a necessary connexion between any other phenomena whatever. Therefore we have the same reason for asserting a necessary connexion between the property of perception and a sound state of the nervous system, as for asserting the same thing of any other phenomena whatever. It will be understood of course, that the nervous system must be excited, before the excitement can be perceived; and whether we adopt Hume's phraseology, or that of Dr. T. Brown in his Treatise on Cause and Effect, the argument will be exactly the same. In all cases, where the necessary connexion between two phenomena is such that the one is denominated a *property*, and the other the *subject* of which the first is a property, the property is universally deemed to result necessarily from the nature or essence of the subject to which it belongs. But as perception must be a property of something; and as it is uniformly connected with a sound state of the nervous system, perception is a property of that system, and results necessarily from the nature or essence thereof.

Such is the proper and direct proof of the doctrine of *Materialism*; which, so far as I am acquainted with the controversy, remains unanswered. But this doctrine will receive additional support, if the opposite doctrine of *Immaterialism* can be shewn impossible or improbable. I shall endeavour to do both.

*Of the Impossibility of the Existence of an Immortal, Indiscrepable, Immortal Soul.*

2.—(a) The Soul hath *all* the properties of matter and no other: or it hath some properties *in common* with matter, and *some* that matter hath not: or it hath *no* property in common with matter.

In the first case, it is matter, and nothing else.

In the second case, it is partially material.

In the third case, it is in no respect or degree material. This last case is the only one of the alternatives that the hypothesis of Immaterialism can consistently maintain: for in so far as the Soul is material, it will be discerpible, mortal, and corruptible.

(b) But let the Soul have no property in common with matter. Then I say: Nothing can act upon another but by means of some common property. Of this we have not only all the proof that induction of known and acknowledged cases can furnish, but that additional proof also which arises from the impossibility of conceiving how the opposite proposition *can* be true. You cannot erect the Colisœum at Rome by playing Haydn's Rondeau. You cannot impel a ray of light by the mace of a billiard table, and so on. This proposition is every where admitted, or assumed, in treatises on natural philosophy.

But by the proposition, the Soul hath no property in common with matter, and therefore it cannot act upon matter. Whereas by the universal acknowledgment of Immaterialists, the Soul acts upon and by means of the material body: but it is a contradiction to suppose that the Soul can and cannot, does and does not, act upon the material body: and therefore the hypothesis involving this contradiction must fall to the ground.

3.—(a) Whatever we know, we know by means of its properties, nor do we, in any case, know certainly any thing but these. Gold is heavy, yellow, ductile, soluble in aqua regia, &c. Suppose gold deprived for an instant of all these properties,—what remains, would it be gold? If it have other properties, it is another substance: if it have no properties remaining, it is nothing; for nothing is that which hath no properties. Hence, if any thing lose all its properties, it becomes nothing; it loses its existence.

(b) Now the existence of the soul is inferred like the existence of every thing else, from its supposed properties, which are the intellectual phenomena of the human being, perception, memory, judgment, volition. But in all cases of *perfect sleep*—of the operation of a strong narcotic—of apoplexy—of swooning—of drowning where the vital powers are not extinguished—of the effects of a violent blow on the back of the head—and all other leipothymic affections,—there is neither perception, memory, judgment, or volition; that is, all the properties of the soul are gone, are extinguished; therefore the soul itself loses its existence for the time; all evidences and traces of its existence are lost; *pro hac vice*, therefore, and during the continuance of these derangements of the nervous system, the soul is dead, for all its properties are actually extinguished. The Soul therefore is not immortal, and of consequence it is not immaterial.

(c) This disappearance of all intellectual phenomena in consequence of the derangement of the nervous apparatus of the human system, is easily accounted for, if they be considered (as the Materialists consider them) no other than phenomena dependant upon the nervous system in its usual state of excitement by impressions *ab extra*, or motions dependant on association originating *ab intra*. On this view of the subject, all

is natural and explicable. But if these intellectual phenomena are the evidences and properties of a separate immaterial being (the Soul) then comes the insuperable difficulty—where is the subject itself when all its properties, all evidences of its existence are annihilated ; though but for a day or an hour A materialist can easily account for returning animation by renewed excitement from the unsuspended action of the functions of organic life.

4. No laws of reasoning will free us from the bondage imposed by matters of fact. It is impossible to deny that all these intellectual phenomena, these peculiar properties of an immaterial soul, these only evidences of its existence, are also properties of the body : for where there is no nervous apparatus, as in vegetables, they never appear ; where the nervous system is deranged by violence, or by disease, or by medicine, these phenomena are also deranged, and even disappear ; when the body dies and the nervous system with it, all these phenomena cease, and are irrevocably gone ; we never possess after death, so far as our senses can inform us, the slightest evidence of the existence of any remaining being which, connected with the body during life, is separated from it at death. This may be asserted, but there is not one solitary fact to prove it : when the body dies, no more perception, no more memory, no more judgment, no more volition. So far as we can see, these die with the body, and exhibit no proof of their subsequent existence. These phenomena, are phenomena then of the body : if they be also phenomena of the Soul, then is the Soul also, like the body, material ; for it has properties in common.

(b) If it be said the Soul may exist after the body is dead and decomposed, I reply, and the soul may also not exist : one supposition is as good as the other. Remember, it is not allowable in fair

argument to take for granted the existence of a thing, merely because it may possibly exist. If you assert its existence, you must prove your assertion. *Affirmantis est probare : a posse ad esse non valet consequentia.*

(c) If any one shall say these properties are only suspended for the time, I would desire him to examine what idea he annexes to this suspension ; whether it be any thing more or less than that *they are made not to exist for the time*. Either no more is meant, or it is plainly opposed to matter of fact. Moreover if more *be* meant, it may easily be proved to involve the archetypal existence of abstract ideas ; to approach to the Platonic absurdities modified by the pre-established harmony of Leibnitz, which, I apprehend, will not be considered as defensible at this day. It can also be shewn that such ulterior meaning will contradict the maxim *impossibile est idem esse et non esse*.

(d) If any one shall say farther, “These mental phenomena are not constituent parts, but acts of the soul, and evidences of its existence ; so that the soul may continue to exist when it no longer continues to act, or to act in this manner. It does not follow that a man’s power of working is annihilated because he has lost the tools or instruments with which he has usually worked,”— I reply : 1. That whenever the evidences of the existence of a thing arise from the nature and structure of the thing itself, they are synonymous with its properties. Such are the phenomena of thinking with respect to the Soul : they are confessedly of its very essence. I cannot give a plainer illustration than I have already given ; let my reader, if he be a mineralogist, sit down and describe a mineral ; and then let him suppose all his characters annihilated. 2. As these intellectual phenomena are *all* the evidences we have of the Soul’s existence, when these are de-

stroyed or extinguished, so is the conclusion drawn from them. When all the evidences of the existence of *life* fail, no one scruples to say that life itself is gone. 3. The instruments with which a man usually work, are only a *small part of, not all* the evidences of his power of working. Were he to lose his senses, and his hands, and his powers of volition, and of voluntary motion, which are also conjoint evidences of his power of working, every one would say he had lost that power ; that is, it no longer existed. 4. It is equally legitimate to assert of gold, for instance, that what are termed its essential and characteristic properties are nothing more than acts and evidences of the existence of the substance gold, which *may* continue to exist, notwithstanding it no longer continues to exhibit any of those phenomena which are termed its properties, but are in fact only temporary evidences of its existence. Would any reasonable man acknowledge the justness of such an argument ? 5. If this conclusion *a posse ad esse—a potentia ad actum*—from the remotest of all possibilities of existence, to actual existence, be allowed—then can any thing whatever be proved to exist in despite of all proof to the contrary. Would not a physician regard that man as a lunatic, who was seriously to say of a putrid dead body before them ; “ to be sure, none of the actions which are the evidences of life are exhibited at present, but life may exist notwithstanding ? ”

5.—(a) All relative terms imply the existence of their correlates : a man cannot be a father without having a child, a husband without a wife, &c. Hence when either of two relatives cease to exist, the other does so likewise.

(b) All those ideas which make up one idea of the Soul, or in other words, all those properties from whence we infer its existence, are relatives ; their correlates are ideas. Thus, there can be

no perception without ideas to be perceived ; no recollection without ideas to be remembered ; no judgment without ideas to be compared ; no volition without ideas of the object on which it is exerted.

(c) Locke has shewn that we have no innate ideas ; that all our ideas are ideas of sensation or reflection ; and that the ideas of reflection are no other than the operations of the mind on our ideas of sensation : that is, all our ideas proceed from, and are founded on the impressions made upon our senses. The doctrine of the ancient school was the same, *nil unquam fuit in intellectu, quod non prius erat in sensu*, which is not the less true for being acknowledged as true by the wisest men of antiquity.\* I am aware of the “ faculties of the

\* That the best informed of modern writers hold the same doctrine, and that the whole phenomena termed mental are merely excitations of the nervous system perceived, I assert, on the authority of Cabanis, of Bichat, of Blumenbach, of Richerand, of Magendie ; as well as Hartley, Darwin, Priestley, and Lawrence. The elementary works of Bichat, Richerand, Blumenbach, and Magendie, being usually read in all our medical schools, I subjoin the references.

See Bichat, Phys. Res. (Dr. Watkins' Edit. 1809, Philad.) p. 105, prope finem. Richerand, (Dr. Chapman's Edit. 1813, Philad.) p. 390—392 and p. 400. Blumenbach, (Dr. Caldwell's Edit. 1795, Philad.) p. 195 of Vol. I. Magendie, (Dr. Revere's Edit. Baltim. 1822,) p. 102, 103.

The reader will find that the best informed and most approved elementary writers on physiology adopt the Latin axiom in the text, verbatim, or in substance. So Haller, Phys. § 556, describes a sensation as an affection of the brain perceived. Primæ Lineæ, Edinb. 1767.

I strongly suspect that no man is qualified to write on metaphysics and the phenomena of intellect, who is not well versed in physiology, a branch of knowledge in which the Scotch school of metaphysicians are sadly deficient.

I do not mean to include Dr. T. Brown in this tirade against his superficial and dogmatic predecessors. I agree with him, that power and causation are words only, and inseparable from the real and actual antecedents and consequents to which they relate : and that our belief of the invariable attendance of like consequents on like antecedents, under like circumstances, is rather intuitive than a process of reasoning. I much fear, however, he has not succeeded in obviating the difficulty of Hume's argument against miracles ; for all that writer's argument ap-

mind," the numberless brood of the Scotch metaphysicians. I cannot and will not condescend to reply to the dreadful nonsense on this subject assumed as true by Dr. Reid and Dr. Beattie, or to the shallow sophisms of Dr. Gregory, or the pages of inanity of Dr. Dugald Stewart, or the ignorant hardihood of assertion of Dr. Barclay in his late inquiry. We are all before the public, and I am content. In the mean time, let the reader ask himself, how he could acquire ideas of vision without the eye and its apparatus—of odour without the nostrils—of taste without the papillæ on the tongue and palate, &c. Let him say what ideas a man could have, whose senses were entirely wanting. This is enough.

(d) But if all our ideas proceed from impressions made on our senses, as these are entirely corporeal, we never could have attained ideas without the body; that is, there would have been none of the phenomena of perception, recollection, judgment, or volition without the body: that is, there would have been none of those phenomena of thinking from whence we deduce the existence of the Soul—none of the properties of the Soul, without the body: in other words, there would have been no Soul without the body. So that the commencement of the existence of the Soul depends on the commencement of the existence of the body. Such is matter of fact.

(e) But the Immaterialists say, the Soul is distinct from and independent of the body as to its existence: hence, it is both dependent and independent of the body: that is, it does not exist, for contradictions cannot co-exist.

plies to the introduction of new antecedents and of the usual and natural course of phenomena; and the difficulty of establishing this introduction by testimony remains just as before. Dr. Brown has substituted one form of defence for another, but he has not substantially altered the state of the case. Brown, however, is a clear sighted and able metaphysician.

*The Immortality, a parte ante, of the Soul being null, let us examine its Immortality a parte post.*

(a) All impressions made on our senses can be traced up to the internal sentient extremity of the nerve impressed, and no further.

(b) When an impression has been made on our senses by means of external objects, we have the property of perceiving the effect of that impression at a distance of time, and after the original impression has ceased. This is *memory* and *recollection*. Hence, although all our ideas have been caused by impressions made on our senses originally, we may lose one or two of our senses, and yet remember the ideas which are the effect of the impressions formerly made on them.

(c) But ideas can no more be remembered without the nervous system, than they could have been caused originally without the senses. All this is plain matter of fact.

(d) At death, however, not only all our senses are destroyed, (the only sources of original ideas) but the nervous system itself is destroyed, which is the *sine qua non* to the existence of ideas already caused. At death, therefore, all our ideas of every kind are destroyed.

(e) But there can be none of the properties of the Soul without ideas; for these are relates and correlates; and if all the properties of the Soul are destroyed, the Soul itself is destroyed.

(f) Therefore, whatever may be the case during the life of the body, the Soul did not exist previous thereto, and is destroyed when that is destroyed.

(g) And when it is considered that many circumstances during the life of the body may totally destroy for a time all the properties of the Soul, the little of existence that remains is hardly worth contending for.

(i) But when it is further considered, that the natural immortality of the Soul is supposed a necessary consequence of its immateriality, it will be a necessary consequence that this immaterial soul does not exist at all.

6. If the Soul exist at all, it must exist somewhere, for it is impossible to frame to one's self an idea of any thing existing which exists nowhere, and yet whose operations are limited as to space.

(b) But if the Soul exist somewhere, by the terms it occupies space; and therefore is extended; and therefore has figure or shape, in common with matter.

(c) Moreover by the supposition of every Immortalist (except Malbranche, Leibnitz, and Berkely) the Soul acts upon the body; that is upon matter. That is, it attracts and repels, and is attracted and repelled; for there is no conceivable affection of matter, but what is founded upon, and reducible to, attraction and repulsion. If it be attracted and repelled, its re-action must be attraction and repulsion. This implies solidity.

(d) The Soul then possesses extension, figure, solidity, attraction, repulsion. But these comprise all the properties by which matter is characterized, and the Soul therefore, whatever else it be, is a material being.

(e) But it cannot be both material and immaterial at the same time, and therefore it does not exist.

7. Those truths which we derive from the evidence of our senses, carefully observed and sufficiently repeated, are more weighty than such as are mere deductions of reason and argument. If I feel that by beating a large stone with my fist I shall hurt my knuckles, I cannot doubt of that, after a sufficient number of trials. If I find that a large quantity of strong wine will render

me intoxicated, I cannot disbelieve the result of experience. I see that the mental phenomena are connected with the organization of the human body, by means of the nervous apparatus which is a part of it. I know by observation and experience that if you destroy that part of the nervous system which supplies any one of the organs of sense, as the optic nerve of the eye, the organs of that sense no longer supply me with the same feelings as before. All this is matter of fact, ascertainable in the same way that we ascertain the effect of a bottle of Madeira ; by the use of our senses. About all this we can no more doubt, than about our existence. But what evidence can we possibly have of the existence of the Soul. It is not cognizable by any of our senses—by any of the common inlets of knowledge—it is, by the hypothesis, immaterial, it hath no relation to matter. By the very nature of it, we can have no sensible proof of its existence. It is an hypothesis, a supposed being, introduced to account for appearances manifestly connected with our bodily organs, and which, so far as we know, cannot take place without them, whether there be a soul or not. This connexion we see, hear, feel, and know to exist, though we do not exactly know how to trace it. But the Soul has no existence for our senses—it is a being whose existence is assumed because the present state of knowledge does not enable us (perhaps) to account for the precise mode of connexion between intelligence and our nervous system. I shall by and bye shew, that we are just as much at a loss to account for the life of a tree, as for the reasoning of an animal.

But let the reader reflect for a moment, and ask himself, if this hypothetical introduction of an immaterial soul to solve the difficulties that our ignorance produces, be not a manifest breach of the acknowledged axiom, *a posse ad esse non*

*valet consequentia?* A mere refuge for present ignorance of a connexion which future knowledge may unravel.

A THEORY explains unknown facts by the laws and properties of known facts. Newton applied the cause which makes a stone fall to the earth to the tendency of the planets toward the sun. Here was nothing new assumed to aid the reasoning. Had he said that as it was impossible to explain the tendency of the planets toward the sun, by any properties of the planets or the sun, and therefore it must be owing to some angel whose duty it was to impel the planets in their proper direction, this would have been HYPOTHESIS: just like our notions of the Soul to account for the phenomena of the body.

So that we not only have no direct and satisfactory evidence of the existence of the Soul, and from the presumed nature of it never can have, but the clear, direct, undeniable evidence of our senses is all the other way.

"I see" (says Mr. Hallet, in his discourses) "a man move, and hear him speak for some years. From his speech, I certainly infer that he *thinks* as I do. I see, then, that man is a being who thinks and acts. After some time, the man falls down in my sight, grows cold and stiff. He speaks and acts no more. As the only reason I had to believe that he did think, was his motion and speech, so now that they cease, I have lost the only way I had of proving that he had the power of thought. Upon this sudden death, the one visible thing, the one man is greatly changed. Whence could I infer that the same *he* consists of two parts, and that the inward part continues to live and think, and flies away from the body, while the outward part ceases to live and move? It looks as if the *whole man* was gone, and that all his powers cease at the same time. So far as I can discern, his motion and thought die together."

"The powers of thought, speech, and motion equally depend on the body, and run the same fate in case of men's declining old age. When a man dies through old age, I see his powers of motion and thought decay and die together, and each of them by degrees: \* the moment he ceases to move and breathe, he appears to cease to think too.

"When I am left to mere reason, it seems to me, that my power of thought as much depends on my body, as my power of sight and hearing. I could not think in infancy. My powers of thought, of sight, and of feeling are equally liable to be obstructed by the body. A blow on the head has deprived a man of thought, who could yet see, and feel, and move. So that naturally the power of thinking seems to belong as much to the body, as any power of men whatsoever. Naturally there appears no more reason to suppose a man can *think* out of the body than that he can hear sounds or feel cold out of the body."

If this be the case (which cannot be denied)—if there neither be in fact, nor from the nature of the thing ever can be, any direct evidence for the existence of an immaterial, distinct, independent soul—still further, if all the direct and positive evidence that there can be of any thing whatever, all that the present case can in the nature of it admit, is *against* the existence of such a soul—how strong, how absolutely irrefragable, how evident ought that reasoning to be, by which its existence is inferred! Even the possibility of its being fairly and honestly disputed, is a strong presumption against its conclusiveness. Who can fairly and honestly dispute the dependence of thought on the body?

8. I apprehend all the phenomena termed mental or intellectual, are explicable as phenomena

\* The reader will recollect Gil Blas' Archbishop of Toledo.

of the body. Hartley, and Destut Tracey, the one in his first volume on Man, and the other in his *Ideologie*, have done it to my satisfaction. I cannot enter into their reasonings; they must speak for themselves. The public by and bye will give to these authors that fair play which the orthodoxy of the moment will not concede to them.

9. We have not the slightest proof of any kind that ideas can arise or can exist independently of corporeal organization. We have never known them so to exist. We know not, nor have we from facts, the slightest reason to believe that they can. But the Soul itself has been invented to account for them. They are (by those who believe in a separate Soul) considered as essential to that being—the peculiar property and result of the Soul's operations. But where is the proof that ideas can exist in the Soul without the body? Where is thought when the body dies? Where was thought before the body began to exist? *De non apparentibus et non existentibus eadem est ratio.* All assertions are equally true concerning that which doth not exist, and that of whose existence there is no evidence.

Such are the arguments of an abstract and metaphysical nature, on which I ground my opinion that an immaterial, immortal soul, separate from the body, does not and cannot exist: and it appears to me, from what has been said, that there is the same proof for the truth of the doctrine of *Materialism*, as that gold is heavy, ink black, water fluid, or any other indubitable assertion. Also that there is the same proof that the opposite doctrine *cannot* be true, as that contradictory assertions cannot be both true.

I come now to a class of arguments that assume a physiological rather than a metaphysical character. But before I enter upon this branch

of the subject, I beg leave to state some physiological propositions relating to the animal system, that bear upon the subject in question.

The objects around us have been conveniently classed into the mineral, vegetable, and animal kingdoms. The particles of the bodies whereof each kind of substance is composed, have peculiar active properties; by which they arrange themselves, when free from the obstacle of pressure by foreign bodies, into some peculiar form.

The particles of a *mineral* substance, when they have full time and room to arrange themselves according to their respective propensities, assume certain figures, usually prismatic; of which the number of sides, and size of the angles are determined within certain limits by the chemical constitution of the mineral in question. Hence, the determination of mineralogical species has, within these twenty years, been made to rest on the form of the crystal, particularly by all the mineralogists of the French school. The general fact is indubitable; but the limitations and the precise relations between chemical composition and the figure of the mineral nucleus, have not yet been accurately determined.

Minerals increase in size by the crystallization of adventitious particles round a crystallized nucleus, producing secondary forms; but they do not devour, decompose, digest, assimilate, secrete, excrete, grow, and propagate. They do not seem to have any property to which the term *life* can fairly be applied, or to suffer any thing like what we call *death*; although it is impossible to doubt that they are endowed with active properties. Like all other substances, they are liable to chemical decomposition, and consequent disintegration. They are utterly devoid of sensation and volition; and have no apparatus connecting them with surrounding bodies.

*Vegetab.es* are substances that have a peculiar

organization or arrangement of solid, tubular, cellular, and fluid parts: by means of which they feed, digest, assimilate, secrete, excrete, grow, and propagate their kind. They die of violence, of disease, of old age. They are not locomotive, being fixed by their roots. No nervous apparatus has hitherto been discovered in them; but certain of their fibres are irritable and contractile. Having no nervous apparatus, they have no perception (sensation,) or volition; they do not think. No vegetable has hitherto been clearly ascertained to appear, but as the offspring of a former vegetable: and though, by process of assimilation, inorganic and lifeless matter is converted into organic and living matter, the vegetable life (so far as we know) must pre-exist. The chief use of vegetables seems to be the furnishing of food for animals, and partially preparing lifeless and inorganic matter to become sentient and capable of pain and pleasure. With the exception of less than one part by weight in a thousand, vegetables are resolvable into carbon, hydrogen, oxygen, with a small portion of nitrogen, potassium, and phosphorus. The earths found in them do not seem to be essential to their composition.

*Animals* are substances that have a peculiar organization or arrangement of solid, tubular, cellular, and fluid parts; by means whereof, they devour, digest, assimilate, grow, secrete, excrete, and propagate. They die of violence, of disease, of old age. When dead, they are decomposed into azote or nitrogen, carbon, hydrogen, oxygen, lime, and phosphorus. They are locomotive. They have a muscular apparatus for that purpose; and they have a nervous apparatus for the purposes of sensation and volition, by which they are connected with surrounding objects animate and inanimate. By assimilation, they convert inorganic and lifeless into organic, living, and sentient matter. It has not yet been clear-

ly shewn, that any animal has arisen unless as successor to some similar animal, his immediate progenitor. The *nitus formativus* of Blumenbach, the theories of Darwin and La Marck, are not impossible, but have as yet few converts. The doctrine of equivocal generation *seems* to have the weight of fact against it. The Zoophytic animals, the *animalculæ infurosiæ*, the worms and other parasites that prey on the internal parts of living animals, form difficulties, but no exceptions; just as the vegetable efflorescences, the mosses, the *conservæ*, and other minute vegetations do in Phytology.

Every vertebrous animal has (*a*) an organic system destined to support the mere life of the animal, and which is analogous to the organic system of a vegetable: (*b*) a muscular system destined in part for internal action, in part for locomotion; (*c*) a nervous system, in part subservient peculiarly to organic and muscular life, and in part subservient peculiarly to sensation and volition.

The involuntary muscles possess, by means of secretion supplied by the organic system and the nervous apparatus appropriated to it, a power of contraction, or of becoming thicker and shorter, on the application of stimulus. Stimulus may be either the natural stimulus of the nervous system, or of the blood, or it may be artificial. The actions of the involuntary muscles go on, without being felt or perceived. The voluntary muscles are stimulated naturally by that portion of the nervous system which is appropriated to sensation and volition. Galvanic processes have to a certain degree been found a substitute for the nervous stimulus of the muscles, voluntary and involuntary.

It has been ascertained, that the muscular power resides in the muscles, and is a property of the muscular fibre, and is distinct from the

nervous power, which acts merely as a stimulus to muscular irritability. It has been ascertained that the nervous power destined to the purposes of involuntary, insentient, organic life, is distinct from the nervous power destined to the purposes of sensation and volition ; for each can be shewn separate from the other. It has been made highly probable, that the first mentioned portion of the nervous system is confined to the medulla oblongata and the ganglionic plexuses : the latter and more important portion, to the brain as its centre.

I am aware of Dr. Ferriar's collection of cases in the Manchester Transactions ; of Sir Everard Home's collection of cases in the Philosophical Transactions ; and of many other cases not included in the papers of these gentlemen, where lesions of the brain have occurred without much apparent injury to intellect. No physiologist regards them as weighing a feather against the supposition of the brain being the centre of the nervous system appropriated to sensation and volition : for we do not yet know, by experiment, what portions of the brain are exclusively so ; nor is a general fact established by induction of innumerable particulars, to be set aside, on account of a few apparent anomalies of difficult explanation. The theory comprises those parts of the brain that *are* essential to sensation and volition ; and not the more bulky mass which appears merely as a subservient envelope. The experiments of Sir Everard Home on the connexion of memory with the cortical substance, and the more important "Researches" of M. Flourens, promise to throw light on this difficult subject, which only requires patient and pursued investigation. Some internal sentient extremity there must be to each main branch of the nerves of the senses. In relation to the present inqui-

ry, place it where you please, or where the best settled facts point out.

The above views that I have taken of the mineral, vegetable, and animal economy, I offer to the reader not as any deductions of theory, but as expressions of separated and ascertained fact, which a well read modern physiologist will hardly venture to gainsay, under the limitations I have used in stating them. I refer to Bichat, Richerand, Magendie, Dr. Wilson Philips, Sir Everard Home, and the Physical Researches of M. Flourens in p. 299 of vol xx. of Ann. de Chim.

I proceed to my *second class* of arguments.

1. The propensity of the minute particles of quartz to unite together in a six-sided prism terminated by six-sided pyramids—of the zirconite to assume a tetrahedral prism terminated by tetrahedral pyramids—of the diamond and garnet to appear as dodecahedrons—of pyrites as a cube—of carbonate of lime as a rhomboid, &c. &c. so that their particles seek out an union with adjacent particles, not indiscriminate and promiscuous, but in the peculiar manner proper to form these figures—is either a property of the material particles themselves, or it is owing to some separate being or principle who impresses on the particles the necessary force in the necessary direction on each occasion. No one hitherto, however, has thought of ascribing this propensity but to some property belonging and essential to the particles themselves.

The arrangement of the nutritious matter taken in by a vegetable, in the peculiar form which that vegetable affects, and by which it is characterized, has usually been attributed to the effect of vegetable life as connected with vegetable organization. No one hitherto has advanced the hypothesis of a vegetable Soul—distinct from the plant, but regulating and governing it—a being

superior to, and surviving, the vegetable. Yet there is no more difficulty in supposing perception a property of a nervous system, than vitality a property of a vegetable system. We see them both, like other properties, intimately and essentially connected, as antecedents and consequents, with the subject to which they are referred; and we refer them accordingly, as in all other cases of similar connexion. How is life of any kind the result of mere matter and motion?

We see in the human frame a nervous apparatus that is essentially connected with sensation and volition, from which these properties arise—that serves no other purpose than to give birth to them—we see them in infancy in a state approaching to nonentity; forming gradually and slowly; growing with the growth of the being to which they belong, and improving by degrees—we see them vary in kind and intensity according to our education, and the nature of the society in which we are thrown—we see them dependant for all their characters on the manner in which that part of our nervous system is excited ab extra; so that a man born and educated in Constantinople will have one set of impressions, one habit of sensation and volition, and a man with a similar arrangement of nervous apparatus born and educated among the Quakers at Philadelphia will have another. All this is the result of generating causes extraneous to the system—owing to specific peculiarities of excitement that causes the nervous apparatus to act in this manner rather than in that, and to assume different habits. I say, we see all this to be in every case, undeniable matter of fact. How then can we deny sensation and volition to be the result of the stimulated nervous system? There is the same connexion of phenomena, the same uniform result of that connexion, presenting no more difficulty in the case of sensation and volition,

than in the case of glandular secretion and animal heats; or muscular motion; or sanguification; or the secretion of resin in the pine, and sugar in the maple from the same introspected fluid. All the processes are equally inexplicable from any *a priori* arrangement of matter and motion; all of them stand in equal need for explanation of an immaterial principle; for although we see clearly that these are the phenomena of organized matter in each case, yet in no case can we explain the rationale by any of the known properties of other inorganized matter. Hence, according to the psychological doctrines, we must resort to some distinct and superadded being; to the *anima intellectualis*; the *anima sensitiva* and the *anima vitalis* of the ancients,—or to the separate faculties of the Scotch school of metaphysics, a species of entities most accommodating, ready for all work, and always in waiting—or to the equally unintelligible arrangement of Dr. Gall's craniology—or to some being of analogous existence to the immaterial Soul of the orthodox. For I assert, and appeal to matter of fact, that,

*There is exactly the same evidence that sensation or perception and volition are properties of the nervous apparatus of the human system, that there is of contractility being a property of muscular fibre, or polarity the property of a particle of pyrites or a particle of light.*

On the truth of this proposition, I should (were it necessary) be willing to rest the controversy. In the one case and the other, constant concomitance is the sole foundation for ascribing necessary connexion. If it be sufficient in any one of the cases, it is sufficient in all. It is not necessary that we should be able to explain the quomodo: it is enough that our senses, under careful observation, assure us of the fact. Future facts and the future improvement of the hu-

man intellect will enable our posterity to do that which our more imperfect knowledge will not enable us to accomplish : just as the present generation are able to explain what remained an enigma to their forefathers.

2. I have said above, that our perception, volition, and in fact our other intellectual faculties, begin from nothing in infancy, grow with our growth, improve with our experience, vary with our education, and differ, not merely as to the nervous systems excited, but in consequence of the habitual difference in the stimuli applied. Suppose the original intellect of two infants exactly the same ; educate one among the thieves of broad St. Giles in London, and the other among the best class of Philadelphian Quakers, would their intellect be the same at one and twenty ? But is the Soul thus mouldable and changeable ? Is the Soul infantile as well as the body ?

3. If the intellectual phenomena depended entirely on the Soul, then we should be unable to produce, annihilate, alter, or modify them by any mere mode of action operating merely on the body. But

Our ideas are frequently produced and commonly modified by the internal state of our bodily organs—by the state and condition of our organic life : hence the phenomena of dreaming, of delirium, and the hallucinations of hypochondria ; and the alterations produced in our sensations and ideas by our state of internal health. Our ideas also are produced and modified by substances exhibited to us acting medicinally ; as by wine, by opium, by cantharides, &c. But as Judge Cooper has said in his Medical Jurisprudence, how can you exhibit a dose of glauber's salts to the Soul ?

If then sensations, ideas, reasonings, and vo-

itions, are produced, modified, or extinguished, by the condition of the involuntary parts of our organic system—by disease—by medicine: if they be (as we know they are) greatly under the command of the physician who acts only on the body—are not these effects thus produced by means of the body, bodily effects? What has the Soul to do with them? Are not these effects, however the only evidences of the Soul's existence—the essential, incommunicable properties of the Soul, according to the Immaterialists? Yet are they manifestly produced on the body; and so far as we can see, on the body alone, by means of material stimuli calculated to act solely on the body?

If it be said, the body is no more than the instrument of the Soul, which can only act according to the condition of that body with which it is connected, and when the body is altered, the intellectual phenomena which it is calculated to exhibit, are altered also—then it follows, from the evidences of what takes place, that the very nature of the Soul is altered by altering the condition of the body, and the Soul therefore is under the control of accident, of disease, of medicine, and may be just what a physician chooses to make it. For if a physician can control the intellectual phenomena of sensation, memory, judgment, and volition, (as he can) then are all the *essential* properties of the Soul itself subject to the articles of the *Materia Medica*, and slaves of the *Pharmacopeia*.

4. I have already said, that no phenomena of mere matter and motion—no principle of mechanical or chemical philosophy can account for the phenomena of life and stimulus—for digestion, assimilation, secretion. These are just as difficult as sensation, memory, or volition: the interposition of an immaterial Soul is as necessary to

vegetable life, as to the human faculties. If this be denied, shew me where and by whom they have been explained, or explain them if you can.

5. I appeal to any physician accustomed to cases of insanity ; and I ask whether all the intellectual appearances in that disease are not manifestly the result of the morbid state of the bodily organs ? Is not this the case from the most violent symptoms of mania, to that almost imperceptible obliquity, from which in some degree or other, hardly any of us are free. In fact, such as is the state of our system, such are the mental phenomena we exhibit : the latter are the result of the former. Can you put a male mind into a female body, or vice versa ? Let a parent decide this question ; he will answer at once, No. Can you put an old head on young shoulders ? No.

6. But there are no mental phenomena exhibited by the human species that are not also exhibited by the brute species. The difference is concomitant with difference of organization. The superiority of the human being arises from his erect position, from the skill with which he can use his hands, and from the faculty of speech. These give rise to the manipulations of art, and to the preservation and propagation of knowledge. For want of these, one generation of brutes is little wiser than the preceding. There is with them no means of accumulating knowledge. When a dog has lost his master, does he not seek him at the places his master has been accustomed to frequent ? I know by oft repeated facts in my own case, that he does. Does not this imply memory, ratiocination, volition ? So many volumes of instances of the sagacity of animals, particularly of the canine species, have been collected, and instances are so familiar, that I would not condescend to argue with a man who would have hardihood enough to deny it. All

these are intellectual phenomena *of the same kind* with such as we exhibit ; the difference is in complication and degree only. They are evidences therefore of an immaterial, immortal, distinct Soul, producing them. What say you to the immortal Soul of an opossum or an oyster ?

I see no possibility of denying the facts, or avoiding the conclusions ; and I leave the difficulty to be overcome by those who choose voluntarily to encounter it.

The Christian finds no difficulty in it. He says, that by nature, all animals, human and brute, die and return to the dust they are made of : but God has been pleased, through Jesus Christ, to promise a future state of rewards and punishments, and a future immortality to human beings. Hence, to the Christian, who has no evidence but the Scriptures for this, those sacred writings are of inestimable value.

Finally, I say, that the phenomena termed mental, have been so well explained by Hartley, Cabanis, and Destut Tracey, that no man conversant with their writings, can hesitate to allow this. I say it is not possible for a fair man, conversant with physiology, to deny, that a sensation from recent impression, and an idea from recollection, are motions in the brain (or common sensory) perceived. As all our intellectual phenomena consist of sensations or ideas, which are the materials and substrata of memory, judgment, and volition, all of them consist in motions communicated to the corporeal nervous system — to the common sensory ; whether by external impression, by association, or by internal sympathetic action. They are therefore corporeal phenomena, and no more. Destut Tracey has shewn this so clearly, and so well explained the phenomena of memory, judgment, desire, volition, as mere names given to various states and conditions of our brain, that I do not expect any

refutation will or can be given to the view of the subject he has taken. Orthodoxy is in the seat of authority now, but truth will prevail at last.

In speaking of the brain as the common sensory, I speak according to the language of all physiologists of repute, who seem not to be shaken by the anomalous cases to the contrary. Ferriar's collection is good for little, because his authorities are sometimes deficient in accuracy of observation, and sometimes in credibility. But whether the internal sentient extremities of the sensorial nerves terminate in the brain or elsewhere, is of no moment whatever to the argument; they must terminate somewhere; and where they do terminate, is, for my purpose, equivalent to the brain; and this word may be used for the sensorium, wherever that may be.

In arranging the preceding arguments, facts are repeated; but the point of view in which they are placed, authorises me as I have thought, to distribute them under distinct heads.

I know the obloquy to which Mr. Lawrence, the surgeon, has been exposed, in consequence of his having advanced the opinion of the materiality of the Soul, or rather the singleness of human nature as consisting of the organized body only; but the obloquy that results from clerical persecution, popular bigotry, and professional jealousy cannot detract from the reasoning of a man on all hands confessed to be among the most able and best informed anatomists and physiologists of the day. I give therefore the following extract copied with some few omissions and unimportant alterations from his lecture on the *Functions of the Brain*. Mr. Lawrence's book has been widely disseminated in England; but it is comparatively unknown in the United States; for not one bookseller in the Union is hardy enough to publish it! Such is the state of the press in this country of boasted freedom, and

such the tyranny exercised by the orthodox clergy over the minds of the people ! A tyranny that I have a right to exclaim against, because I feel it, for I know of no bookseller who would put his name to this pamphlet :—

“ There would be little inducement to compare together the various animal structures, to follow any apparatus through the whole animal series, unless the structure were a measure and criterion of the function. Just in the same proportion as organization is reduced, life is reduced : exactly as the organic parts are diminished in number and simplified, the vital phenomena become fewer and more simple ; and each function ends when the respective organ ceases. This is true throughout zoology : there is no exception in behalf of any vital manifestations.

“ The same kind of facts, the same reasoning, the same sort of evidence altogether, which shew digestion to be the function of the alimentary canal, motion to be the function of the muscles, the various secretions of their respective glands—prove that sensation, perception, memory, judgment, reasoning, thought, in a word, all the manifestations called mental or intellectual, are the animal functions of their appropriate organic apparatus, the central organ of the nervous system. No difficulty or obscurity attends the latter case, which does not equally affect all the former instances : no kind of evidence connects the living process with the material instruments in the one, which does not apply just as clearly and forcibly to the other.

“ Shall I be told that thought is inconsistent with matter ; that we cannot conceive how medullary substance can perceive, remember, judge, reason ? I acknowledge we are entirely ignorant *how* the parts of the brain accomplish these purposes ; we know only the fact : we are equally ignorant how the liver secretes bile, how the

muscles contract, or how any other living purpose is effected : and so we are how heavy bodies are attracted to the earth, how iron is drawn to the magnet, or how two salts decompose each other. Experience is, in all these cases, our sole, if not sufficient instructress, and the constant conjunction of phenomena, as exhibited in her lessons, is the sole ground for affirming a necessary connexion between them. If we go beyond this, and come to inquire the manner how—and attempt to discover the mechanism by which these things are effected, we shall find every thing around us equally mysterious, equally incomprehensible : from the stone which falls to the earth to the comet traversing the heavens—from the thread attracted by amber or sealing wax to the revolutions of planets in their orbits—from the formation of a mite in cheese, or a maggot in putrid flesh, to the production of a **NEWTON** or a **FRANKLIN**.

"In opposition to these views, it has been contended, that thought is not an act of the brain, but of an *immaterial* substance, residing in, or connected with it. This large and curious structure, which, in the human subject, receives one-fifth of all the blood sent out from the heart ; which is so delicately and peculiarly organized, so nicely enveloped in successive membranes, and securely lodged in a solid bony case, is by this supposition left almost without an office : being barely allowed to be capable of sensation. It has indeed (under this hypothesis) the easiest lot in the animal economy ; it is better fed, clothed, and lodged than any other part, and has less to do. But its office (only one remove from a sinecure) is not a very honourable one : it is a kind of porter, instructed to open the door, and introduce new comers to the master of the house, who takes on himself the entire charge of receiving, entertaining, and employing them.

"Let us survey the natural history of the human mind—its rise, progress, various fates, and decay—and then judge whether these accord best with the hypothesis of an immaterial agent, or with the plain dictates of common sense, and the obvious analogy of every other organ and function, throughout the boundless extent of living beings.

"But you must bring to this physiological question, a sincere and earnest love of truth : dismissing from your minds all the prejudices and alarms which have been so industriously connected with it. If you enter on this inquiry in the spirit of the bigot and the partisan—suffering a cloud of fears and hopes, desires and aversions, to hang round your understandings, you will never discern objects clearly ; their colours, shapes, and dimensions, will be confused, distorted, and obscured by the intellectual mist. Our business is to inquire what is true, not which is the finest theory—not what will supply the best topics of pretty composition and elegant declamation addressed to the prejudices, passions, and ignorance of our hearers. We need not fear the result of investigation : reason and free inquiry are the only effectual antidotes of error. Give them full scope, and they will uphold the truth, by bringing false opinions, and all the spurious offspring of ignorance, prejudice, and self interest, before their severe tribunal, and subjecting them to the test of close examination. Error alone needs artificial support ; truth can stand by itself.

"Sir Everard Home, with the assistance of Mr. Bauer and his microscope, has shewn us a man eight days old from the time of conception ; about as broad and a little longer than a pin's head. He satisfied himself that the brain of this homunculus was discernible. Could the immaterial mind have been connected with it at this time ? Or was the tenement too small even for so ethereal a lodger ?

Even at the full period of utero-gestation, it is still difficult to trace any vestiges of mind ; and the believers in its separate existence have left us quite in the dark on the precise time when they suppose this union of Soul and body to take place. Some endeavour to account for the entire absence of mental phenomena at the time of birth by the senses and brain *not having been yet called into action*, by the impressions of external objects. The senses and brain begin to be exercised as soon as the child is born ; and a faint glimmering of mind is dimly perceived in the course of the first months of existence ; but it is as weak and infantile as the body.

" As the senses acquire their powers, and the cerebral mass becomes firmer, the mind gradually strengthens, advances slowly with the body through childhood to puberty, and becomes adult when the development of the frame is complete ; it is, moreover, male and female, according to the sex of the body. (The propensities, the modes of thinking and acting, are manifestly influenced by sex.) In the perfect period of organization, the mind is seen in the plenitude of its powers ; but this state of full vigour is short in duration, both for the intellect and the corporeal fabric. The wear and tear of the latter is evidenced in its mental movements : with the decline of organization the mind decays ; it becomes decrepit with the body ; and both the one and the other are, at the same moment, extinguished by death.

" What can we infer from this succession of phenomena ? The existence and action of a principle entirely distinct from the body ? Or a close analogy to the history of all other organs and functions ?

" The number and kind of the intellectual phenomena in different animals, appear to correspond closely to the degree of development of the

brain. The mind (mental or intellectual faculties) of the Negro, Hottentot, Calmuck, and Carib, is inferior to that of the European; and their organization also is less perfect. The large cranium and high forehead of the ourang-outang lift him above his brother monkeys; but the development of his cerebral hemispheres, and his mental manifestations, are both equally below those of the Negro. The gradation of organization and of mind passes through the monkey, dog, elephant, horse, to other quadrupeds: thence to birds, reptiles, and fishes; and so on to the lowest links of the animal chain.\*

"In ascending these steps of one ladder, following in regular succession at equal intervals, where shall we find the boundary of unassisted organization? Where place the beginning of the immaterial principle called in aid? In that view which assimilates the functions of the brain to those of other organic parts, this case has no difficulty. As the structure of the brain is more exquisite, perfect, and complex, its functions ought to be proportionally so. It is no slight proof of the doctrine now enforced, that the fact is actually thus: that the mental powers of brutes, so far as we can see, are proportional to their organization.

"We cannot deny to animals all participation in rational endowments, without shutting our eyes to the most obvious facts; to indications of reasoning which the unprejudiced observation of mankind has not failed to recognise and appreciate. Without adverting to the well known instances of comparison, judgment, and sagacity in the elephant, the dog, and many other animals, let us read the character drawn by *Humboldt* of

\* This is well illustrated in the plate at the beginning of Mr. White of Manchester's Essay on the Gradations of Man. His plate is taken from Camper and Blumenbach. Lawrence's plates also are from the same sources.

the South American mules : ‘ When the mules feel themselves in danger, they stop, turning their heads to the right and to the left. The motion of their ears seems to indicate that they reflect on the decision they ought to take. Their resolution is slow, but always just, if it be free ; that is to say, if it be not crossed or hastened by the imprudence of the traveller. It is on the frightful roads of the Andes, during journies of six or seven months, across mountains furrowed by torrents, that the intelligence of horses and beasts of burthen displays itself in an astonishing manner. Thus the mountaineers are heard to say, I will not give you the mule whose step is the easiest, but him who reasons best.’ 5 Pers. Narr. 111. If the intellectual phenomena of man require an immaterial principle superadded to the brain, we must equally concede it to those more rational animals which exhibit manifestations differing from some of the human only in degree. If we grant it to these, we cannot refuse it to the next in order, and so on in succession to the whole series ; to the oyster, the sea anemone, the polype, the mycroscopic animalcules. Is any one prepared to admit the existence of immaterial principles in all these cases ? If not, he must equally reject it in man.

“ It is admitted that an ideot with a mal-formed brain, has no mind : that the sagacious dog, and half reasonable elephant do not require any thing to be superadded to their brains : it is admitted that a dog or elephant excels inferior animals, in consequence of possessing a more perfect cerebral structure ; it is strongly suspected that a NEWTON and a SHAKSPEARE excelled other mortals only by a more ample development of the anterior cerebral lobes ; by having an extra inch of brain in the right place ;\* yet the Imma-

\* I do not think, with Mr. Lawrence, that the mere size of the brain is alone sufficient to account for difference of intellect :

terialists will not concede the obvious corollary of all these admissions, viz. that the mind of man is merely that more perfect exhibition of mental phenomena which the more complete development of the brain would lead us to expect; but they still perplex us with the gratuitous difficulty of their immaterial hypothesis. Thought (it is positively and dogmatically asserted) cannot be an act of matter. Yet no feeling, no thought, no intellectual operation, has ever been seen but in conjunction with a brain; and living matter is acknowledged by most persons to be capable of what makes the nearest possible approach to thinking. The strongest advocate for Immaterialism seeks no further than the body for his explanation of all the vital processes of muscular contraction, nutrition, secretion, &c. operations quite as different from any affection of inorganic substance, as reasoning or thought: he will even allow the brain to be capable of sensation.

“Who knows the capabilities of matter so perfectly, as to be able to say, that it can see, hear, smell, taste, and feel, but cannot possibly reflect, imagine, judge? Who has appreciated them so exactly, as to be able to decide that it can execute the mental functions of a dog, an elephant, or an ourang-outang, but cannot perform those of a Negro or a Hottentot? To say of a thing known only by negative properties, that is, an immaterial substance, which is neither evidenced by any direct testimony, nor by any indirect proof from its effects, that it does exist and can think, is quite consistent in those who deny thought to animal structures, where we see it going on every day! .

the greater or less irritability of the whole nervous system—the aptness of the nervous system to admit associations—the facility with which ideas of former impressions are called up by association—the greater permanence and more extensive associations of particular classes of impressions and ideas, &c. &c. are probably powerful sources of difference.

" If the mental processes do not constitute the function of the brain, what is its office ? In animals which possess only a small part of the human cerebral structure, sensation exists, and in many cases is more acute than in man : what employment shall we find for all that man possesses over and above this portion—for the large and prodigiously developed human hemispheres ? Are we to believe that these serve only to round the figure of the organ, or to fill the cranium ?

" It is necessary for you to form clear opinions on this subject, as it has a direct and immediate reference to an important branch of pathology. They who consider the mental operations as acts of an immaterial being, and thus disconnect the sound state of the mind from organization, act very consistently in disjoining insanity also from corporeal structure, and in representing it as a disease not of the brain, but of the mind (or Soul.) Thus we come to a disease of an immaterial being ! for which, suitably enough, moral treatment has been recommended.

" I firmly believe, on the contrary, that the various forms of insanity—all the affections comprehended under the general term, mental derangement—are no other than evidences of cerebral affections. They are disordered manifestations of those organs whose healthy action produces the phenomena called mental ; they are, in short, symptoms of a diseased brain. These symptoms have the same relation to the brain, as vomiting, indigestion, heart burn, to the stomach ; cough, asthma, to the lungs ; or any other deranged functions to their correspondent organs.

" If the biliary secretion be increased, diminished, suspended, or altered, we have no hesitation in referring it to changes in the condition of the liver as the immediate cause of the phenomena. We explain the state of respiration, whether slow, hurried, impeded by cough, spasm,

&c. by the various conditions of the lungs and other parts concerned in breathing. These explanations are deemed perfectly satisfactory.

" What should we think of a person who told us that the organs had nothing to do with the business: that cholera, jaundice, hepatitis, are diseases of an immaterial hepatic being; that asthma, cough, consumption, are affections of a subtle pulmonary matter; or that, in each case, the disorder is not in the bodily organs, but in a vital principle? If such a statement should be deemed too absurd for any serious comment in the derangements of the liver, lungs, and other organic parts, how can it be received in the brain?

" The very persons who use this language of diseases of the mind, speak and reason correctly respecting the other affections of the brain. When it is compressed by a piece of bone, or by effused blood or serum, and when all intellectual phenomena are more or less completely suspended, they do not say that the mind is squeezed—that the immaterial principle suffers pressure. For the ravings of delirium and frenzy, the excitation and subsequent stupor of intoxication, they find an adequate explanation in the state of the cerebral circulation, without fancying that the mind is delirious, mad, or drunk. In these cases, the seat of the disease, the cause of the symptoms, is too obvious to escape notice. In many forms of insanity, the affection of the cerebral organization is less strongly marked, slower in its progress, but generally very recognisable, and abundantly sufficient to explain the diseased manifestations;—to afford a material organic cause for the phenomena—for the augmented or diminished energy, or the altered nature of the various feelings and intellectual faculties.

" I have examined, after death, the heads of many insane persons, and have hardly seen a

single brain which did not exhibit obvious marks of disease. In recent cases, loaded vessels, increased serous secretions: in all instances of longer duration, unequivocal signs of present or past increased action; blood vessels apparently more numerous, membranes thickened and opaque; depositions of coagulable lymph forming adhesions or adventitious membranes; watery effusions; even abscesses. Add to this, that the insane often become paralytic, or are cut off by apoplexy.

"Sometimes, indeed, the mental phenomena are disturbed without any visible deviation from the healthy structure of the brain; as digestion or biliary secretion may be impaired or altered, without any recognisable change of structure in the stomach or liver. The brain, like other parts of this complicated machine, may be diseased sympathetically;\*" and we see it recover. Thus we find the brain, like other parts, subject to what is called functional disorder; but although we cannot absolutely demonstrate the fact, we no more doubt that the material cause of the symptoms or external signs of disease is in this organ, than we do that impaired biliary secretion has its source in the liver, or faulty digestion in the stomach. The brain does not often come under the inspection of the anatomist in such cases

\* As in puerperal cases. To this reasoning of *Lawrence*, I would add, that diseased brain may depend on the connexion between the stomach and bowels. Thus, we see diseased digestion and morbid action of the intestines produce hypocondria and melancholy; such is often the case from worms. Drunkenness affects the brain by means of the stomach, and prussic acid kills by destroying the functions of the nervous system. The as yet untraced connexion of all the parts of that system, by means of which, when one part is disordered, a distant part becomes disordered also, is physiologically termed sympathy. Thereby intending that the connexion is as yet only known by its effects, and not anatomically shewn.

Dr. Haslam's publications on insanity corroborate strongly all Lawrence's reasoning.

of functional disorder ; but I am convinced from my own experience, that very few heads of persons dying deranged will be examined after death, without shewing diseased structure, or evident signs of increased vascular activity. The effect of medical treatment completely corroborates these views. Indeed they who talk of, and believe in, diseases of the mind, are too wise to put their trust in mental remedies. Arguments, syllogisms, discourses, sermons, have never yet restored any patient ; the moral pharmacopeia is quite inefficient ; and no real benefit can be conferred without vigorous medical treatment, which is as efficacious in these affections as in the diseases of other organs.\*

" In thus drawing your attention to the physiology of the brain, I have been influenced not merely by the intrinsic interest and importance of the subject, but by a wish to exemplify the aid which human and comparative anatomy and physiology are capable of affording each other ; and to shew how the data furnished by both, tend to illustrate pathology. I have purposely avoided noticing those considerations of the tendency of certain physiological doctrines which have sometimes been industriously mixed up with these disquisitions. In defence of a weak cause, and in failure of direct arguments, appeals to the passions and prejudices have been indulged ; attempts have been made to fix public odium on the maintainers of this or that opinion ; and direct charges of bad motives and injurious consequences, have been reinforced by all the arts of misrepresentation, insinuation, and innuendo.

" To discover truth, and to represent it in the

\* Moral medicine can only act by introducing and exciting new trains of ideas and of thought : but these are affections of the brain in fact ; and are therefore medicines operating directly on that organ. All ideas of whatever kind are motions excited in the brain, and there felt or perceived.

clearest and most intelligible manner, seem to me the only proper objects of physiological, or indeed any other inquiries. Free discussion is the surest way not only to disclose and strengthen what is true, but to detect and expose what is fallacious. Let us not then pay so bad a compliment to truth, as to use in its defence foul blows and unlawful weapons. Its adversaries, if it have any, will be despatched soon enough, without the aid of the stiletto or the bowl. The argument against the expediency of divulging an opinion, although it be true, from the possibility of its being perverted, has been so much hackneyed, so often employed in the last resort by the defenders of all established abuses, that every one who is conversant with the controversy, rejects it immediately, as the sure mark of a bad cause—as the last refuge of retreating error."

So far Mr. Lawrence. *Lectures on Physiology, Zoology, and the Natural History of Man.* 8vo. London, 1819. Pages 105—115. I have already assigned my reasons for making this extract so long.

The following extract from Mr. Sawrey's edition of Dr. Marshall's *Morbid Anatomy of the Brain*, London, 1815, p. 209, will express my notion of the functions of the brain and nerves very well, except that he has omitted the sympathetic action on the nervous system of excited or depressed states of the parts destined to internal organic life, when different from their usual and natural states. A morbid excitement or derangement of any viscus will affect the state of the nerves belonging to it, and by sympathy with them, the general nervous system. Hence, the state of the brain, and the ideas that arise in it, will be more or less modified by the state of the organic and internal apparatus destined to keep up life. Hence dreams from indigestion. Hence hypochondria from morbid action of stomach and

bowels. Hence, the associations will, to a certain degree, be modified by, and depend on the internal state of the body, as well as on external impressions ; and the sensations arising from external impression will, to a certain degree, vary with the general state of health or disease. Hence sensations, ideas, and associations may arise from the state of the internal organs, and are not exclusively dependant on external impression.

The following extract from Dr. Andrew Marshall will shew the generally received doctrine relating to the functions and properties of the nerves, the brain, and the nervous system ; and shew that my views of the subject are the same with that of all well informed physiologists of the present day :—

Observations on the functions of the Brain and Nerves, p. 209. "The primary functions of the brain and nerves consist in their rendering us conscious of the existence and properties of surrounding objects : and while in this world, of the existence and properties of ourselves. For although things exist with all their properties independent of us, and therefore when a man perishes, not the smallest particle of surrounding nature is annihilated, or in the least unhinged by his dissolution, yet it is by our possessing brain and nerves, that the independent existence and properties of surrounding objects come home to our perceptions. Matter of the same form with that of the human body (except the brain and nerves) might exist and be animated, but without these organs, it would be unconscious of its present existence, or of the properties and various conditions of surrounding nature.

"Living systems destitute of brain shew no signs of their being impressed with any feeling or consciousness. The polypus, according to the observations of Haller and others, has no brain or nerves : accordingly it appears to perform the

motions requisite to its preservation by a necessity of which it seems to be unconscious. Vegetables also are living systems, but having no brain they appear destitute of sense. They take in, assimilate, and apply nourishment, perform secretions, generate and separate heat, preserve their own substance from putrefaction, perform motions in consequence of irritations, and produce prolific seed. But all these actions seem to be performed from blind necessity, and without any sort of intelligent consciousness.

"But in living systems furnished with a brain and nerves, so long as they are entire, and in the condition which health gives and requires, the animal remains sensible of the existence of surrounding nature, or susceptible of that consciousness; but when injury is done to the brain, the consciousness of the impressions resulting from the contact of external matter (of which kind are both light and air) is, according to the degree of injury, perverted, suspended, or extinguished. Yet injuries inflicted on other organs of the body, in no wise affect the sense, unless when they symptomatically involve the brain. The same comparison, leading to the same conclusion, may be made in respect to the diseases of the brain and other parts.

"It must be admitted, that in order to produce peculiar sensations, there must be the health and entire structure of the nerves in connexion with the brain. For to destroy the extremities of nerves, destroys the peculiar sensations which these nerves exhibit while remaining sound. If the retina be injured or destroyed, vision is impaired or lost; if the ultimate distribution of the olfactory nerves be destroyed, there is no more smell.

"Although light should be properly refracted, yet if it should fall on the optic nerve before it expands into retina, it would not occasion any

vision; nor would odours, if conveyed to the olfactory nerves within the scull, probably, give occasion to smell; nor is it probable that sapid substances would excite a sense of taste, if applied to any point of the nerves of taste other than the nervous papillæ of the tongue.

" But necessary as the extremities of the nerves are to the production of peculiar sensations, they cannot be reckoned sentient: for if their connexion with the brain be interrupted by compression, no peculiar sensation arises from impression on the extremities; but if the compression be removed, the power of giving the peculiar sensation returns. Yet though the compression of the nerves interrupts or destroys the peculiar sensations usually referred to their extremities, a sense of feeling in different modes, subsists between the part compressed and the brain: so that the power of contributing to a certain degree of sense, which would be lost between the ligature and the extremities, survives between the seat of the injury and the brain. The sort of feeling so remaining is sometimes a sense of obscure touch, sometimes a sense of pricking or a sense of pain.

" We therefore conclude that there is no manner of sensibility in nerves but in connexion with the brain. That the power by which we see, hear, feel, &c. is a power of the brain, the nerves being only a *conditio sine qua non* of particular sensations referred to nervous extremities, and the brain being rather the efficient cause of these sensations, and giving susceptibility to a certain degree at least to that portion of nerve left connected with it:—may it be added, that independent of any conditional impression on the nerves, the brain itself, from impressions immediately on itself, is sentient; for let any set of nerves whatever be destroyed, or let no particular impression whatever be made on the nerves,

a sense of head ache, vertigo, noise, colours, &c. may be, and often is produced by disease.\*

"The sphere of cerebral power exerted in conjunction with, or in consequence of impressions made on the nerves, is great. By the brain being affected through the medium of the eyes, we are made acquainted with the colour, figure, magnitude, and motion of external things placed at a greater or less distance from us. This is the sense of seeing: an inlet to human knowledge, at once necessary to preservation, and to open a view of the striking and beautiful phenomena of nature.

"The existence, degree of distance, hardness, and several other interesting qualities of objects placed at a distance, seen or unseen, come home to our perceptions, through tremors of the air affecting the brain through the ear. This is the sense of hearing; by which we are warned of unseen danger, perceive operations of nature though unseen, and comprehend the signs or words employed by our fellow creatures to express their sensations and passions.

"The qualities of sapid substances, which we are interested in perceiving, their sweetness, acidity, bitterness, saltness, and aromatic nature, are perceived, when these qualities, through the medium of the tongue, excite the proper sensations in the brain. This is the sense of taste. The qualities suggested by taste, constitute a sort of index of the salutary, innocent, or perni-

\* The experiments of Sir Everard Home and M. Fleurens shew this. Moreover, as I have observed before in this tract, the organic functions, which in a healthy state go on without producing sensation, in a diseased state, or in a state of great excitement, do produce sensation, by affecting generally the whole nervous apparatus. In a state of over healthy excitement, (if I may so express myself) dreams are sometimes more intensely vivid than their analogous waking sensations. So, deranged stomach and bowels, and worms, may produce hypochondria, idiocy, and even mania.

cious nature of substances presented as food, rather than point out the actual composition of these substances. This sense seems given chiefly with a view to the preservation of the animal; for by it, man is induced to take in wholesome food, and to avoid improper and hurtful food: the former being in general agreeable, and the latter, disagreeable, at least to a taste not corrupted by luxury. It is a common, yet curious observation, that the same nerves which are susceptible of impressions from sapid substances, are also nerves of touch; so that a substance in the mouth, is both tasted and felt; its superficial qualities of hardness, smoothness, &c. being also perceived. This conjunction of both senses, seems requisite in the tongue, since a substance taken into the mouth, may be as hurtful from its superficial qualities, as its roughness, angles, edges, &c. is from its acrid, saline, or putrid qualities.

"The nourishment and refreshment of the body, are farther assisted by our being enabled to perceive certain qualities of sapid substances before we take them into the mouth. This is done by volatile particles of the substances affecting the internal parts of the nose, and through these the brain. Thus, the sense of smelling is auxiliary to taste, as it admonishes us of the quality of sapid substances, before we use them too freely; as it induces us to take in proper food, which is generally of a pleasant smell, if it smells at all; and as it keeps us from unwholesome food, which is generally of a disagreeable odour. Odours are the object of this sense; and different odours affecting the brain through the nose, produce different sensations of smell, as either pungent, sweet, or putrid, &c. These suggest in some degree, what may be expected from swallowing or applying the substance; but express nothing concerning its internal structure or composition. Air is the vehicle of odour.

" To assist vision, and to make amends for its defects, there is a consciousness implanted in us of the contact of external things.\* The nerves that receive the impression from which this consciousness results, are almost universally present in the body: and if they remain every where free and connected, in a healthy state, with an entire and healthy brain, the contact of external things, and internal changes, are perceivable in almost every part of the body. Several modes of feeling may be marked: 1st. by the contact of external things with the extremities of the nerves of feeling, we acquire a perception of the hardness, softness, roughness, smoothness, heat, cold, figure, magnitude, pressure, and weight of whatever is within our reach. This is the sense of *touch*, properly so called; the most correct and extensive of all the senses, subservient to self preservation, and supplying man with exact and enlarged conceptions of what takes place in nature.

" 2dly. Certain parts of the body occasionally fall into a state which gives rise to a particular mode of feeling, followed by certain propensities. These give occasion to actions, which being exerted relieve the propensity. Thus a certain languid state of the circulation through the lungs, gives a peculiar uneasy sensation that produces yawning. A sense of irritation in the nose gives rise to sneezing; a sense of irritation about the

\* That is, we feel them when they approach us near enough to give rise to this sensation. There is no consciousness different from feeling or perception. When the retina is excited by the light of a candle, and the motion is propagated along the optic nerve to its extremity within the brain, I feel, I perceive, I am conscious, of the impression. We cannot be conscious of the actual contact of bodies, because no particles of matter are in absolute contact. They recede without solution of continuity by heat, they contract by cold. A ray of light impinging on a looking glass, is reflected, as Sir Isaac Newton has shewn, at the  $\frac{1}{37}$ th part of an inch previous to contact. All this is well illustrated by the diagram of Father Boscovich.

glottis to coughing ; a sense of tickling of the skin to laughter, &c. Some of these peculiar modes of sensation have names, and some have not. Like other sensations, they admit of no definition. Their final intention is evident, since they tend to throw off the offending cause that produces them.

" 3dly. Certain parts of the body are constantly in a healthy state, peculiarly susceptible of impression ; such as the glans penis, and some other parts ; the final cause whereof, is also evident.

" 4thly. All the parts of the body, supplied with nerves, are susceptible of impression which gives occasion to sense of pain. The impression here arises from whatever hurts, destroys, or forms disease ; and the sense excited by it, makes us take pains to avoid injury, and get rid of disease, By the bye, taking man as he is, and admitting the laws of nature at present established, to be wise and good, pain is not an evil, but the result of a wise and beneficent providence ; since it tends to preserve our existence more unerringly and directly than any other mode of sense with which we are endowed. The exciting cause of pain is the impression of injury or disease : the efficient cause, the connexion of the part so injured or disordered with the brain ; and the final cause, the preservation of the animal. These are some of the modes of feeling : each of the other senses is also a genus, under which are included various modes of the sensation referred to the organ.

" When we compare the different senses together, two or three observations occur to us ; one is, that the first four senses, take place only when certain due degrees of impression are made on the extremities of the nerves distributed to that organ. If the impression be too slight, no peculiar sense arises ; if it exceed in measure, instead of the sense of seeing, hearing, &c. there

is merely a sense of pain. Thus, the first four senses, when their organs are injured, agree with the sense of feeling. Another observation is, that as the sense of feeling arises from impressions made in those parts of the body, so it is more difficult to destroy than the other senses. When the extremities of the nerves of the other senses are destroyed, peculiar sensations connected with them, also cease: but the remaining body of nerves retains a sense of feeling: and the extremities of the nerves appropriated to feeling only, being destroyed, the extremities of the portion left, resume the peculiar susceptibility of the original extremities: thus, in the case of W. Scott, whose penis was carried off by a gun-shot, the stump of it, which was even with the skin of the pubis, resumed the peculiar sensibility of the glans penis: also the cicatrix of sores in other parts of the body, becomes susceptible to impressions of touch.

"But extensive as the sphere of sensation is, and how much soever of the universe, it unfolds to human comprehension, the powers of the brain are not confined to mere sensation. The brain is likewise the corporeal organ, whose health and entire structure, are necessarily connected with all intellectual powers, all internal senses, and all the passions.

"*Memory* depends on the brain. After living but a few weeks in the world, exposed to the contact of surrounding things, and to light reflected from their surfaces, we cannot avoid recognising sensations, as being mere repetitions of similar impressions from the same forms of matter. We recognise the similar sensations, and feel within ourselves, that formerly we were affected exactly in a similar manner by the impression on the organ of sense. This recognising of sensations and belief of their being repetitions, happens by the same physical necessity

with which the first sensations of the kind we ever had, arose from the original and first impressions. We cannot but taste, when sapid substances are applied to the tongue; nor can we pass by the consciousness, that there is a repetition when the same taste is renewed. This is the simplest form of memory: it occurs in an infant a month old, when it begins to recognise its nurse. After living longer, continually affected with the true sense and impressions of external things, and after being masters of more certain experience, we naturally improve upon the simple memory of a single sensation, and acquire gradually a power of recalling a train of sensations, in the order and circumstances in which they were originally perceived. They are recalled with a belief that they were formerly impressed upon us, by objects which do not now affect us. This is memory in greater perfection. A faculty which, spiritual as it may seem, is seldom exerted, but when it sets off from the vantage ground of some resembling, contrary, or otherwise related actual sensation of a present object.\*

"*Judgment* is another power naturally founded in sensation. For to compare two sensations together, to glide insensibly into a belief that they are compatible or incompatible in the same subject, are as necessary consequences of having formed the sensation, as the sensations were the consequences of the brains having been affected by the impression. Thus, if you present a red rose to a child who never has seen one before, but who has seen a white rose, it has immediate-

\* *Hume*, in his *Essay on the Connexion and Association of Ideas*, and *Lord Kames* in his *Elements of Criticism*, (Chapter on Ideas occurring in a train) have seen the same facts and reasoned in the same way. But Dr. *Hartley* has treated the subject so plainly and yet so profoundly, that he has, in my opinion, exhausted it: the objections of modern sciolists to that great man notwithstanding.

ly the complete sensation of a red rose: and if it can speak it will express a judgment and belief that it is a red rose. This is the birth of judgment.

"The power of *reasoning* in like manner grows out of sensation. For, let a youth after some experience of the properties of things, be supposed master of two distinct independent perceptions, but not to have experience enough to incline him to a belief, that they are naturally and properly compatible in the same object, what resource has he? If the determination interests him, he naturally and immediately recollects a known third perception, with which one of the two sensations is known from experience to agree: and with this third recollected perception, he is insensibly drawn to compare the other perception.

"Let it be inquired, will the eating of the berries of the deadly nightshade kill me? I run back to some conception allied to the question; as that these berries poisoned one of my neighbours. I know that I am of the same nature with that neighbour; so that as the berries poisoned him, and I am of the same nature with him, I conclude (as a matter of experience,) that they will kill me.

"In the same manner, might we trace *fancy*; the power of *abstraction*; and the power of *classing* things, to their origin from actual sensation;\* but that is at present declined. I would only remark, that *all intellectual powers whatever, depend as much on the brain for their exertion, as simple sensation does*: for living systems furnished with no brain, discover as little reason, &c. as they do sense: and injuries done to the brain of the nature of those enumerated above, while they hurt or suspend sense, hurt, suspend,

\* Destut Tracey has done this.

or pervert the powers of memory, reason, judgment, &c. Nay, in some injuries and diseases of the brain, the powers of intellect are more deranged than those of pure sensation. Maniacs, in whom it has been proved, that the brain is topically affected, and probably always in fault, are often exact in particular sensations, but err widely in judgment and reasoning. A sufferer too under the operation of the trepan, is found sometimes possessing feeling, but erring in reason; and refers the whole operation, and all that is said and done, to some other person.<sup>t</sup>

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"All the internal senses also depend on the brain, and on the perceptions which we cannot help receiving, as we live under the continual contact and impression of external things. These are naturally stems, from which the various additional senses called internal, branch off. We cannot hear sounds agreeable in combination, without a sense of harmony. We cannot see the form of regularity of parts, and the colour of most flowers, without believing them to be beautiful: nor understand the signs by which our fellow creatures express or betray their feelings, without a belief, that they in return comprehend our signs: nor witness their actions without approving some of them, and blaming others. This is the physical birth of the senses called *internal*, which seem to be peculiar to man: and they also depend on the brain. For not to dwell on other instances, if the most delicate and chaste female be seized with a phrenitis, she loses her habitual sense of delicacy: and if injury or disease in the brain induces mania, the maniac ceases to feel the obligations of morality.

<sup>t</sup> I have omitted here a disquisition of about a page and a half on the nature of our sense of beauty; which did not appear to me necessary to the chain of reasoning.

"The distinction of sense into external and internal, does not go to discriminate the two sets of sense ; for they are equally internal and external. Nothing further can be understood than that the one set of internal senses is excited when external things affect the organs of sense : but the other does not immediately require the impression of external things to produce them.

"Lastly, *all the passions and appetites* depend on the brain, for their corporeal organ. Objects whose properties come home to us through the primary sensations, do not leave us in a state of indifference. The primary perceptions give birth to senses called internal; and the internal senses to appetites, passions and volitions. These depend upon the brain : not only because they grow out of sense, which depends on that organ, but because when the brain is injured or diseased, it is found equally or more severely to alter, pervert, or extinguish passions and appetites.

"In phrenitis, no alteration is more remarkable than alteration and disorder in the passions. This will appear from an unusual apprehension of imaginary evils, an unusual anxiety about friends, and unusual hatred against enemies. I once saw a phrenetic patient with Dr. Pitcairn. some of his senses were lost ; taste in particular. But his regard for his wife was expressed in a tempest of passion ; it was the rage of love : at other times he had the most delicate, yet groundless jealousy. Maniacs in the exacerbation of their complaints, are preternaturally irascible or furious ; they go into fits of devotion with a fervour and religious awe, of which sound reason is hardly susceptible.

"There is a remarkable peculiarity in the state of the brain, observed as a law of the animal economy, which is, that the exertion is subjected to a periodical suspension more or less complete, called *sleep*. It is a complete suspension of the

power of the five senses, and of the action of the voluntary muscles ; for in sound sleep, particular sensations do not occur, nor are the powers which grow out of sensations exerted. But, in unquiet nights, though no actual sensation occurs, no immediate impression on any organ of a peculiar sense being perceived, the powers of memory, fancy, reason, and judgment, with various internal senses and passions, are differently exerted. They proceed in an unusual way, not for want of reason, but from want of actual sensations to correct wrong judgments, and to direct all these powers according to the reality of things.\*

\* The brain, as the chief seat of the nervous apparatus, is liable to be affected by impressions made by external objects on the senses—by any preternatural or morbid state of the organ itself—by any sympathetic affection with the internal organs or viscera—and by the state in which it is put by the various associations of past impressions. Hence when morbidly excited, as in the lower states of phrenitis, apoplexy, or gout, sensations arise, both sleeping and waking, that would not occur in its common state ; the impressions and associations are altered and modified, and all intellectual processes are correspondently deranged. Why ? Because according to the acknowledged axioms of the schools, the character of the recipient determines the mode of reception of the thing received ; *quicquid recipitur, recipitur ad modum recipientis.* Hence Mr. Owen of Lanark is right in supposing that man is the creature of the circumstances in which he is placed. Suppose four human beings with organs similarly constituted in all respects at ten years of age, one bred up among the Brachmins of Hindostan, one as a Mussulman at Constantinople, one among the straitest sect of Calvinistic Seceders, and one among the Savans of Paris : it is manifest, the impressions and associations to which the nervous systems of these beings would be respectively exposed from the age of ten to the age of fifty would be extremely different : their intellectual powers would be different, and the effect of motives and of evidence upon them, would be as various as their various educations. For I submit the following reasoning as unanswerable. The brain (place the seat of sensation wherever you please) is subject to the laws of the animal economy : it is passive in receiving impressions : the state of the brain is modified by the impressions it receives : the state of its associations of impressions with ideas, of idens with ideas, depends upon the actual state of the brain however produced : all the intellectual powers consist of, and depend on, the associations of ideas (that is, of associated motions excited or occurring in the seat of sensation :) hence all intellectual powers and processes, whether

"The effect of *sleep* is to restore the power of the brain and nerves. Independent of the sealing up of actual sensation, the muscular parts in themselves require periodical suspension or abatement of their energy. Long continued actual sensations, strong sensations lasting but for a short time, suffering of moderate pain for a long time, or intense pain for a short time, much thinking, pursuing a long train of abstract reasoning, great exertions of memory, &c. gradually blunt the powers of the brain and nerves, and a cessation of actual sensation occurs: and, if in this insensible state, other powers of the brain be exerted, their exertion is less fatiguing than when we are awake, because in sleep, their exertion is not fixed or regulated by attention, which is one of the most fatiguing powers of the brain. In like manner, long continued muscular action of the voluntary muscles, induces a sort of inability in them, and in sleep their energy is restored. On awakening after a due length of time spent in sleep, all the powers of the brain, and the energy of the muscles are restored in a proper degree.

"I cannot quit this part of the subject without

*in potentia* or *in actu*, are dependant on the state of the brain or seat of sensation; and therefore on the circumstances which have produced this involuntary state of the organ, whatever those circumstances may have been. But let us take for granted a Soul. Then if the brain can thus modify the Soul, and the Soul thus modify the brain, are not both the one and the other material—subject to the laws of organic matter? What then do you gain by introducing this creature of metaphysical fancy—this hypothesis which adds no force and removes no difficulty? Which must act upon matter, and be acted on by matter, to make its existence evident? Which those who believe in it acknowledge to be a mere *ens rationis*? Which has never been seen, felt, heard, or understood? Which is not cognizable by any human inlet of knowledge? Whose introduction and pretensions can be well traced to the power it affords the clergy over the conduct and belief of their fellow creatures? And which can derive no countenance from the words or actions of Christ or his Apostles, or the general belief of the Christian world for at least four centuries after Christ?

observing that all the powers proved to belong to the brain, are equally peculiar in their nature. To be conscious of the figure of a circle, or the colour of a flower, is as refined and as wonderful a power as reasoning is. And though these powers to the vulgar belief are a necessary consequence of an impression on the organ of sense, they have as little resemblance to such impressions, as reasoning in an abstract manner has.\*

"There are yet two other questions, which seem necessary to be considered. *First*, whether the brain properly so called, and the cerebellum, medulla spinalis, &c. possess equal sentient powers ?† No doubt can remain that they do, when we consider that injuries or disease in whichever of these integrant portions of the whole mass they happen, equally occasion stupor and insensibility, or are accompanied with violent exertions of the muscular powers. But the muscular disorder is most obvious, when those parts are affected which give origin to nerves, that supply the involuntary muscles. Also, injuries or disease prove equally fatal, whether in the brain,

\* This passage seems to allude favourably to Berkely's hypothesis. In fact, the external world is an hypothesis to account for our sensations; but an hypothesis to which we are irresistibly driven by the laws of the animal economy, which compel us to resort to it. Doubtless, as our author says, there is as much difficulty involved in the fact of sensation or perception, as in any process of reasoning. They are both processes depending on the properties of the bodily organ employed in them: properties, which we can no more explain than we can explain the cause of life, or electricity, or gravitation. These are all properties belonging to the substance with which we find them connected. In like manner, perception or sensation, thought, volition, &c. are properties of the substances with which we find them connected. If the latter require a Soul to explain them, so do the former; no good reason exists in one case, that does not in the other. If gravitation be an essential property of any given mass of matter, so is perception and thought of the nervous apparatus of the human being; and for like reason in both cases, viz. we see them constantly accompanying each other.

† Further experiments are necessary to determine this. Those of Sir Everard Home and M. Fleurens, if followed up, would assuredly throw light on the functions peculiar to the various parts of this organ.

cerebellum, medulla oblongata, or medulla spinalis. A man is killed by being shot through the head. The fiercest bull is instantly killed by thrusting a knife through between the first vertebra, and the posterior edge of the foramen magnum occipitis into the beginning of the medulla spinalis.\* An elephant is killed in the same manner. Robert Walker, a soldier, was killed by a shot through the cauda equina. Lastly, the equal sentient power of these different portions is evinced, by their giving origin to nerves of particular organs of sense. The brain gives nerves to the nose and eyes ; the cerebellum to the skin, muscles of the face, the tongue and the teeth. The medulla oblongata gives nerves to the ear ; the medulla spinalis to the muscles and skin of most of the body.

"The *second* question is, whether the whole substance of the brain, cerebellum, &c. be equally sentient? The nerves proceed from the medullary, not the cineritious part. This continuity of substance, compared with the effects of tying, dividing, or destroying nerves, renders it probable, that it is principally the medullary parts of the brain, which are the origin of the power ascribed to it.† The medullary substance of all the portions forms one continuous mass, is apparently fibrous, the fibres being incredibly minute,‡

\* This experiment of Vesalius, Dr. W. Hunter used to exhibit to his class on a jackass. It is the Spanish mode of killing, not only at their bull fights, but among their butchers ; and it is doubtless a humane one.

† There are some facts of lesions of the brain, that have not yet been explained. Many are collected on dubious authority by Dr. Ferriar in his letter to Th. Cooper, Esq. in the fourth volume of the Manchester Transactions; and many on better authority by Sir Everard Home. Anatomists and physiologists, however, agree in considering these anomalies as not militating against the general position. Future experiments may well explain them. We are in the infancy of medullary physiology as yet.

‡ Gall & Spurzheim's anatomical exhibitions of the structure of the brain, I apprehend, have settled the fibrous nature of medullary substance, in the way nearly as Marshall has stated it. The other parts of their Craniology are not so clear.

convolved in regular intricacy, apparently without beginning, and ending no where but in the extremities of nerves. The two hemispheres of the brain communicate by transverse medullary bands, and by the union of their crura; while the medullary crura of cerebellum, blend with the medullary crura of cerebrum, &c.

"In the next place, in Haller's experiments on living animals, instituted to determine the different degree of sensibility of different parts of the body, it appeared that the victim of his inquiry, manifested most evident signs of pain, and fell into most violent convulsions, when the medullary substance of the brain was pierced or broken down: but that these symptoms were less considerable when the injury was confined to the cineritious substance.\* Accidental injuries seem also to hurt or disorder sense, according as they extend their effects to the medullary substance. A blow on the upper part of the head, does not stun so suddenly, as a blow near the base of the scull; the cineritious substance abounding in the upper part; the medullary being exterior in the basis of the encephalum.

"If judgment may be formed from one or two cases, a fracture with depression of the os frontis, causes less stupor than a fracture with depression of the parietal bones—the anterior lobes of the brain being supported on the orbital processes of the frontal bones: but the middle part of the hemispheres gravitating on the whole medullary substance below, the compression must extend its influence to the whole. These opinions are strengthened by the case of a soldier, who recovered after being shot through the fore part of the cranium; and from another in whom a piece of the barrel of a gun, was beaten into the

\* I refer to Sir Everard Home's experiments, before alluded to.

fissura magna sylvii, where it remained two days without any violent symptom, being lodged chiefly in the cineritious substance.

" From these circumstances, it is concluded, that the medullary substance at the origin of the nerves, is principally concerned in the functions ascribed to the brain ; and if it would throw greater light on the subject to determine the seat of the soul, we would allege that the whole medullary substance is that seat.\*

" So much we have advanced respecting the precise function of the brain. It is established we hope, beyond all doubt, that the brain so far as a corporeal organ is concerned, gives sensation, intellect, volition, appetite, and passion. Beyond these, its powers seem not to extend as we shall endeavour to shew. By the brain, man is rendered speculative and capable of understanding, and at the same time inclined to action : and is thus fitted for the place he holds in the system of nature.†

\* He says well, *if it would throw greater light on the subject.* What light can be thrown on the functions of the brain, by the supposition of its connexion with a being totally and essentially dissimilar in its nature, and having no common property with the matter of which the brain is composed ? But if the seat of the Soul be in the medullary substance, then has the Soul all the properties of matter, and is material. For having relation to, and occupying space, and space too of a determinate form, then has the Soul solidity, extension, and figure : and as the Soul is placed there to act upon the brain, she has the common properties of all matter, attraction and repulsion, into which all action upon matter (by common consent) can be resolved.

† Here ends the physiology of this sensible writer ; to all of which (subject to the limitations which I have expressed in these notes) I subscribe, as an excellent compendium of that branch of Metaphysics called Ideology ; and beyond all comparison conveying that real knowledge which Dr. Dugald Stewart, with his metaphysical predecessors of the same school at his heels, was so grossly deficient in. More is to be learnt from this summary of Dr. Marshall of genuine physiological metaphysics, than from all the pages of vanity of the writers so much in vogue among those who read without thinking. A man who will separate metaphysics from physiology, is not to be reasoned with.

"It is unnecessary we presume, to guard the account given, by subjoining that when we call the brain the sole organ of sensation, and of all the powers superadded to sensation, we only mean the sole corporeal organ. For reason and the testimony of God declare, that in man there is an immaterial substance, which has a share in perception, thinking, and reasoning, &c.—a mind united with the brain. But an inquiry into the human Soul, is not within the design of this paper. In this account of the brain, no mention is made of the Soul, because it is only the corporeal organ of the powers explained, that we are considering. That there is a Soul within us, as well as an omnipotent spirit that fills, sustains, and actuates the universe, I firmly believe. No less do I believe so from reason, than from the sacred monuments of divine inspiration. But it is to be observed, that in this state of our existence, no act of the mind, can be, or ever is exerted, without a corresponding condition of power in the brain. Brain and Soul, though it is unknown to us, how they are united, are joint agents in this world. The power and health of the former, in every exercise of sense, judgment, memory, passion, &c. is indispensably necessary, and equally so with the presence of the mind. Besides, the brain, and not the Soul, is the proper object of medical or surgical treatment. Had we introduced the mind into our discussion, we must have thrown the brain into the back ground; or have encumbered the narration, with a constant coupling of brain and mind."—p. 244.

Thus far, Dr. Marshall, on the functions of

I consider all that follows of Dr. *Marshall* from the end of this paragraph, as a sacrifice on the altar of prudence to popular prejudice. *Lawrence* is cried down for refusing to pay this homage to the priesthood; and most disgraceful it is to *Abernethy* to have encouraged this hue and cry of ignorance and bigotry against a fellow professor.

the brain and nerves. It is manifest, that he, like Dr. Rush, and many others, was a materialist; but was restrained by popular prejudice, from bringing the whole truth into open day. I cannot blame him. Who can see the obloquy connected with the character of Mr. Lawrence, notwithstanding his eminent learning, industry, and professional skill and knowledge, without excusing the writers, who shelter themselves from the yellings of the bigots, set on by those whose interest it is to cry out, "Great is Diana of the Ephesians."? If the present clerical combinations in which all sects join, however discordant on other subjects, should succeed to bring on again the night of ignorance, (which I much fear will be the case,) the advocates of truth, must rest contented with having deserved the success they could not obtain.

FINIS.

